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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/483,712	01/14/2000	Tongbi Jiang	3815US (98-0670)	8743

7590 10/12/2005

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EXAMINER	
WARREN, MATTHEW E	

ART UNIT	PAPER NUMBER
2815	

DATE MAILED: 10/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No.	Applicant(s)	
	09/483,712	JIANG ET AL.	
	Examiner	Art Unit	
	Matthew E. Warren	2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 July 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This Office Action is in response to the Amendment filed on July 8, 2005.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-16 and 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1 and 2 recite the limitation that the "intermediate structure is free of an encapsulant material...wherein the carrier bond is configured to extend beyond an outer surface of the encapsulant material." This limitation is vague because of limitation of the carrier bond extending beyond an outer surface of the encapsulant material. If the encapsulant material is not present in the intermediate structure, then how do the carrier bonds extend beyond the encapsulant material?

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 2, 5-9, and 13-16, and 19, as far as understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over King et al. (US 5,677,566) in view of Havens et al. (US Pub 2001/0011773 A1).

In re claims 1 and 2, King et al. shows (figs. 6-8) an intermediate structure in the fabrication of a chip scale package comprising: a semiconductor die (14) having an active surface having a plurality of bond pads (18) thereon; a dielectric element (16) having an upper surface and a lower surface, the lower surface of the dielectric element attached to a portion of the active surface of said-the semiconductor die; a plurality of conductive lead frame members (13) having inner ends laterally spaced from said the plurality of bond pads, each conductive lead frame member of the plurality of conductive lead frame members having an upper surface (12) and a lower surface, a portion of the lower surface of each conductive lead frame member of the plurality of conductive lead frame members being attached to a portion of the upper surface of the dielectric element (16) for connecting each conductive lead frame member of the plurality of conductive lead frame members to the active surface of the semiconductor die; a plurality of discrete conductive bond members (22), at least one discrete conductive bond member of the plurality of conductive bond members connecting the inner end of each conductive lead frame member of said-the plurality of conductive lead frame members to at least one bond pad of the plurality of bond pads on the active surface of the semiconductor die; a plurality of conductive carrier bonds (28), at least one carrier bond of the plurality of conductive carrier bonds directly disposed on the upper surface of each conductive lead frame member of the plurality of conductive lead frame

members at a location remote from the inner end thereof and extending transversely from the upper surface thereof', and an encapsulating material (26) disposed about at least portions of the semiconductor die, about the dielectric element, between the active surface of the semiconductor die and the lower surface of a portion of each lead frame member of the plurality of conductive lead frame members, over outer ends of the lead frame members of the plurality, over the plurality of discrete conductive bond members and over a portion of each carrier bond of the plurality of conductive carrier bonds another portion of each carrier bond extending beyond an outer surface of the encapsulating material. King shows all of the elements of the claims except the intermediate structure free of encapsulant material. Havens et al. discloses [0025-0028] a package process in which an intermediate structure in the fabrication of a chip scale structure comprises the intermediate structure being free of encapsulant. The circuit substrate, ILD layers, conductive layers, and external conductors (solder balls 6) are formed prior to the encapsulation process. The encapsulant material is formed last to reduce moisture and improve product yield. With respect to the limitations of the claims concerning the carrier bonds and the intermediate structure being configured to be encapsulated and extend beyond the encapsulant, it has been held that the recitation that an element is "adapted to" perform a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. In re Hutchison, 69 USPQ 138. Havens does however show (fig. 4A) that the carrier bonds (6) are configured such that they would extend beyond the encapsulant (23). Therefore, it would have been obvious to one of ordinary skill in the art at the time

the invention was made to modify the intermediate package structure of King by forming the intermediate structure free of encapsulant as taught by Havens to reduce the amount of moisture in the package during the subsequent encapsulation process and ultimately improving the device yield.

In re claim 5, King et al. shows (fig. 3) wherein the upper surface and lower surface of the dielectric element are attached respectively to a portion of the lower surface of each conductive lead frame member of the plurality of conductive lead frame members and a portion of the active surface of the semiconductor die connecting portions of said the plurality of conductive lead frame members and to portions of the active surface of the semiconductor die.

In re claims 6-9, and 13-16, and 19 King discloses (col. 3, lines 10-21) wherein the plurality of conductive lead frame members comprises a plurality of lead fingers. The plurality of conductive lead frame members comprises a conductive metal. The plurality of discrete conductive bond members comprises a conductive metal. The plurality of discrete conductive bond members comprises bond wires. The plurality of conductive carrier bonds includes metal. King also shows (fig. 4) that the plurality of conductive carrier bonds is selectively located on the upper surfaces of the plurality of conductive lead frame members forming an array over the active surface of the semiconductor die and that the plurality of conductive carrier bonds comprises solder balls.

In re claim 19, King shows (fig. 3) that each conductive carrier bond of the plurality of conductive carrier bonds further comprises an upper portion and a lower portion, the lower portion of a-each conductive carrier bond being attached to the upper

surface of an associated conductive lead frame member of the plurality of conductive lead frame members. The encapsulating material is disposed only about the lower portions of the plurality of conductive carrier bonds.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 3, 4, and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over King et al. (US 5,677,566) in view of Havens et al. (US Pub 2001/0011773 A1) as applied to claims 2 and 9 above and further in view of Lee et al. (US 5,894,107).

In re claims 3, 4, and 10-12, King does not specifically disclose the materials of the dielectric element, the materials of the bond wires, or the types of conductive bond members, but such elements are not patentably distinguishable over the cited art because such materials are well known in the art. However, Lee et al. discloses a (col. 4, line 60 – col. 5, line 20) a chip scale package in which a dielectric element may be any adhesive including polyamide tape or films. The conductive bond members may comprise any conventional connecting members including metal, wires, gold, TAB or thermocompression bonds. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the materials of King and

Havens by using specific materials of polyimide for the dielectric element, gold wires, and TAB or thermocompression bonds for the discrete conductive bond members as taught by Lee to provide well known, suitable conductor connections to form the chip scale package.

Response to Arguments

Applicant's arguments with respect to claims 1-16, and 19 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew E. Warren whose telephone number is (571) 272-1737. The examiner can normally be reached on Mon-Thur and alternating Fri 9:00-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MEW
MEW
October 4, 2005

TOM THOMAS
SUPERVISORY PATENT EXAMINER